

# NAUTIC

## Installation Manual

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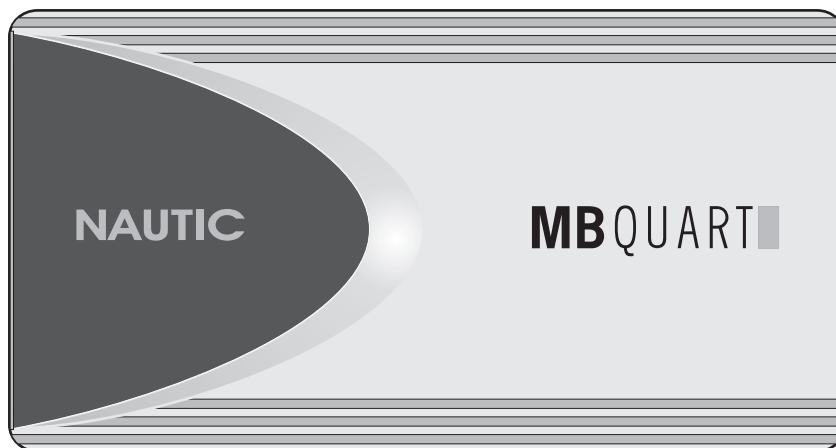


**Congratulations!**

By purchasing an amplifier from MB Quart, you have decided on a product of the highest technical quality. MB Quart wishes you great enjoyment with your amplifier. Should you have any questions about this system or other MB Quart products, please email us at [info@maxxsonics.com](mailto:info@maxxsonics.com)

MB Quart has an incredible Marine amplifier lineup with 2 channel, 4 channel and 6 channel models available. All NAU models feature the following:

- American Boat and Yacht Council compliant Power and Speaker terminals.
- Gold plated Power and Speaker terminals.
- Gold plated RCA connections.
- Marine Grade Conformal Coated circuit board to resist corrosion from salt spray and moisture.
- Non-Corrosive Aluminum extrusion.
- UV and salt spray resistant silk screen and paint.



# NAU260 / NAU460 / NAU660

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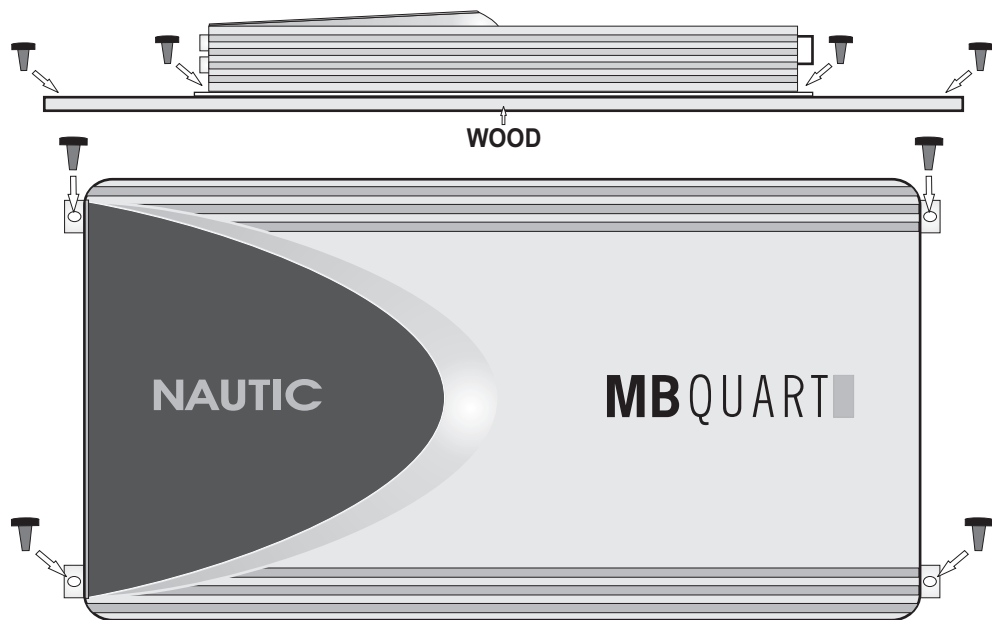
## System Design

The success of any car stereo system relies on several factors, such as the system design, execution of the installation, and system setup. Please remember that any system is only as good as its weakest link. Please remember that higher power systems are not necessarily useful purely for high sound pressure levels, but also to establish a headroom capability, to reproduce musical peaks cleanly without distortion.

Lower power amplifiers will clip earlier than their more powerful cousins, and cause loudspeaker failure when overdriven, due to the harmonics generated by a clipped signal, thus overheating voice coils.

Amplifiers should be mounted with the fins running horizontally for best convection cooling, to minimize overheating. Purchase the best quality RCA cables you can afford, for reliability and less engine noise interference in the audio system.

It is highly recommended that the amplifier be mounted to a board of MDF or other solid structure using the 4 mounting screws provided. Avoid mounting the amplifier to metal as this can introduce noise and other unwanted issues. When mounting the amplifier, ensure that it is mounted HORIZONTALLY, as shown in the diagram above, for optimal heat dissipation. Mounting amplifiers to speaker enclosures is not recommended as this can cause damage to the amplifier components. When choosing a location for mounting the amplifier, ensure that you check for clearance from wires, gas tank, electrical devices and brake lines etc.



# INSTALLATION INSTRUCTIONS

## General Instructions

### General:

Run the wiring so that RCA cables are at least 18" away from power and speaker cables. Keep RCA cables away from electrical devices in the vehicle that can cause electrical noise, such as electric fuel pumps, emission control modules and other on-board electronic modules.

### Power and ground connections:(See table below)

Use a sufficient gauge power cable and ground cable using the chart below as reference to what size wire you require. Nautic series amplifiers require at least 8 gauge power wire. In a multi amplifier system, add the total value of the manufacture recommended fusing to get your total system amperage. Some applications may require multiple runs of power wire to meet the system requirements. In multi amplifier systems it is advisable to mount a large enough fuse right at the battery, and run one or multiple +12 volt power cables to a fused distribution block near the amplifiers. It is then a simple matter to connect the +12 volt terminal of each amplifier to the distribution block. During this process, please ensure that the main power fuse is removed to avoid shorting the electrical system. The main fuse must be within 12" of the vehicles battery.

Ground each amplifier with as short a ground lead as possible directly to the vehicle chassis using at least 8 gauge wire or equivalent to the size of the amplifiers' power wire. Use a ground distribution block, if you wish, but it is extremely important to keep the main ground lead from this distribution block to the chassis as short as possible , not more than 12". The ground connection integrity to the chassis is very important, and the best way to achieve a good, solid electrical and mechanical contact is to use a large round crimp lug, crimped and soldered to the ground cable. The next step is to scrape the paint off the vehicle chassis , slightly larger than the ground lug, at the connection point. Drill a clearance hole in the chassis, the same size as the lug hole, and use a bolt, spring washer and nut to securely fasten the ground lug. Use petroleum jelly to coat the bolt/lug connection, to prevent oxidization with time.

**TIP:** Use the same approach when installing head units, equalizers or any audio equipment for that matter - run short individual grounds from each piece directly to the vehicle chassis, to minimize ground loops and system noise. All power, ground and speaker connections should be crimped and soldered for reliability. Make sure that none of the cable insulation can chafe against exposed metal in the vehicle, causing short circuits to the chassis.

### Safe connection sequence:

After all cables are run, connect speaker wires to the speakers and amplifiers, then run and plug in RCA cables. Next, connect all power, ground, and remote turn on leads. Now connect all +12 volt cables to the amplifier/s and distribution blocks and fuse holders. Finally, connect the main +12 volt cable to the battery, with the main fuse removed, and we are almost ready to power up the system.

### Power up the system:

The following procedure may seem like overkill, but there is nothing more frustrating when turning on a system for the first time, and it does not work properly immediately.

First, make sure the head unit is off, and turn all level controls to minimum (counterclockwise), including the head unit volume control. Set all equalizers to 0 dB (no boost), and all crossover frequency controls at approximate frequencies, as recommended by the loudspeaker manufacturer. Set all input selector and crossover switches as required for the application. Remove all amplifier fuses, and insert the main fuse at the battery. If the fuse does not blow, you can insert the fuse in one of the amplifiers, and we are ready to turn on the system. Turn the head unit on, insert a CD, or select a radio station, and increase the head unit volume control. If the system sounds fine, turn off the head unit, and install fuses in the remaining amplifiers, one by one, till the complete system is powered up and functioning properly.

WIRE LENGTH

SYSTEM AMPERAGE	7-10 ft.	10-13 ft.	13-16 ft.	16-19 ft.	19-22 ft.	22-28 ft.
35-50	8	6	4	4	4	4
50-65	6	4	4	4	4	2
68-85	4	4	2	2	2	0
85-105	4	2	2	2	2	0
105-125	4	2	0	0	0	0
125-150	2	0	0	0	0	0

WIRE GAUGE

# INSTALLATION INSTRUCTIONS

## Settings for Best Performance

### General:

At this point you are ready to get more specific on the settings for your amplifier.

### High Pass:

- When in Hi Pass operation, this setting acts as a low frequency cut off for your system reproduction. The point that you set it at cuts off any frequencies from reproduction beyond this point. The 12 o'clock position is a great starting point. EXAMPLE: If you adjust the High Pass to 100Hz, the amplifier will not play frequencies below 100Hz but will play frequencies from 100Hz to the chosen Low Pass frequency.
- When in Low Pass/Bandpass operation, this setting acts as a low frequency cut off for your system reproduction aka Subsonic Filter. The point that you set it at cuts off any frequencies from reproduction beyond this point. The 12 o'clock position is a great starting point. EXAMPLE: If you adjust the High Pass to 25Hz, the amplifier will not play frequencies below 25Hz but will play frequencies from 25Hz to the chosen Low Pass frequency.
- When in Flat/Full operation, the High Pass crossover is bypassed.

### Bass EQ:

This setting is a fixed bass boost at 45Hz that is variable from 0-6dB. This feature provides impact to your bass, but if not adjusted correctly, it can be over used and cause damage to your speakers and amplifiers. It is best to slowly turn this setting clockwise until the desired punch is felt. It is not recommended to exceed the 12 o'clock position unless listening at a low volume or a low recording quality as this can result in high distortion and possibly clipping.

### Low Pass:

The Low Pass control acts as a ceiling and doesn't allow frequencies to the right of the desired setting to be reproduced. Turning the potentiometer all the way to the right is a great starting point. EXAMPLE: If you adjust the Low Pass to 120Hz, the amplifier will not play frequencies above 120Hz but will play frequencies from 120Hz to the chosen Hi Pass or Subsonic frequency.

- When in Hi Pass operation, this setting is bypassed.

### Level Control Setup:

Ensure that the Level is turned completely to the left prior to turning the system on. Next you should insert a CD or cassette that you are familiar with to use as a reference, and turn the head unit volume control to about 80% of its full setting. The system sound level will of course be very low, and the following procedures will help you to match the amplifier input sensitivities properly to the head unit output signal level. It is important to match the amplifier LEVEL input sensitivity to the Radio/CD output sensitivity. This can be located in the Radio/CD manual. If the Radio/CD output sensitivity is 2 volts, then adjust the amplifier LEVEL input to 2 volts.

If you are not sure what the Radio output sensitivity is, follow these general guide lines:

Turn the level control up slowly, till you hear distortion, then back off a few degrees on the control. If at any point your amplifier goes into protection, you will need to turn the Level to the left a bit and then try again. If you reach a point where the output does not increase, stop turning the Level control to the right as the amplifier/speaker combo has reached its max output in this application.

### 2 or 3 way active systems (all):

Always start with the bass, or low frequency amplifier as a reference, by turning its control up to the point where distortion is audible, and back it off some.

Now adjust the level control for the highs or tweeter channels in a 2 way active system, to balance the highs to lows.

In a 3 way active system, match the midrange level to the bass, and then the highs to the midrange and bass. It may be necessary to perform a few iterations of the midrange and highs level control settings to achieve a satisfactory sound balance.

The key to finding the problem in a misbehaving sound system is to isolate parts of that system in a logical fashion to track down the fault.

## **Description of the Diagnostic system built into all MB Quart amplifiers**

The diagnostic system will shut down the amplifier, until reset by turning the head unit off, and back on. This state of affairs will be indicated by the front panel PROTECT LED lighting up under the following conditions:

- 1 - A short circuit on the loudspeaker leads.
- 2 - An internal amplifier fault that causes a DC offset on the loudspeaker output.

Should the amplifier go into diagnostic mode, simply disconnect all RCA and speaker leads, while keeping +12 volt, power ground and remote leads connected.

1. Now turn the amplifier back on, and if the diagnostic LED lights, the amplifier has an internal fault.
2. If not, plug the RCA cables back, and reset the amplifier. If it goes into diagnostic now, the fault lies in the input, either with bad cables or source unit.
3. If the amplifier seems fine with RCA cables plugged in, connect the speakers, one at a time, and if one of the speakers or its wiring is faulty, it will activate the diagnostic system.

## **Amplifier heatsink overheating**

The amplifiers will shut down when the heatsink temperature reaches 80 degrees centigrade, and turn back on once the unit has cooled down below that point.

### **Causes of overheating:**

- 1 - Inadequate cooling - relocate or remount to provide better natural airflow over the fins.
- 2 - Driving high power levels into low impedances - back off on the volume control, and/or make sure you are not loading the amplifier with less than the recommended loudspeaker impedance.

## **Low output power**

- 1 - Check that level controls have been set up properly.
- 2 - Make sure that the battery voltage, as measured at the amplifier's +12 volt and ground terminals, is 11 volts or more.
- 3 - Check all +12 volt and ground connections.

## **Fuses blowing**

- 1 - The use of loudspeaker impedances below the recommended minimums will draw more current - check.
- 2 - A short on the main +12 volt cable from the battery to the vehicle chassis will cause the main fuse to blow.

## **System does not turn on**

- 1 - Check all fuses.
- 2 - Check all connections.
- 3 - Measure the +12 volt and remote turn on voltages at the amplifier terminals. If these are non-existent or low, take voltage measurements at fuse holders, distribution blocks, the head unit's +12 volt and remote leads to localize the problem.

## **Noise problems**

System noise can be divided into two categories, hiss, and electrical interference.

### **Hiss, or white noise**

- 1 - High levels of white noise usually occurs when amplifier level controls are turned up too high - readjust according to the procedures in section *"Setting up systems after installation for best performance"*
- 2 - Another major problem that can cause excessive hiss, is a noisy head unit - unplug the amplifier input RCA cables, and if the hiss level reduces, the source unit is at fault.

### **Electrical interference**

The inside of an automobile is a very hostile electrical environment. The multitude of electrical systems, such as the ignition system, alternator, fuel pumps, air conditioners, to mention just a few, create radiated electrical fields, as well as noise on the +12 volt supply and ground. Remember to isolate the problem - first unplug amplifier input RCA cables, if the noise is still present, check the speaker leads, if not, plug the RCA's back, and investigate the source driving the amplifier, one component at a time.

### **A ticking or whine that changes with engine RPM:**

- 1 - This problem could be caused by radiation pickup of RCA cables too near to a fuel pump or a distributor, for instance, - relocate cables.
- 2 - Check that the head unit ground is connected straight to the vehicle chassis, and does not use factory wiring for ground.
- 3 - Try to supply the head unit with a clean +12 volt supply directly from the battery +, instead of using a supply from the in dash wiring/fusebox.

### **A constant whine:**

This type of noise can be more difficult to pinpoint, but is usually caused by some kind of instability, causing oscillations in the system.

- 1 - Check all connections, especially for good grounds.
- 2 - Make sure that no speaker leads are shorting to exposed metal on the vehicle chassis.
- 3 - RCA cables are notorious for their problematic nature, so check that these are good, in particular the shield connections.



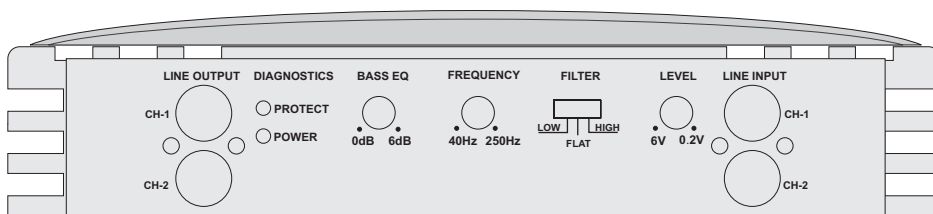
# NAU260

## 2-Channel Amplifier

### NAU260

#### Features:

- PROTECTION and POWER LED indicators
- BASS EQ: 45Hz bass boost from 0dB to 6dB
- FREQUENCY: Variable based on FILTER selection
  - In LOW the FREQUENCY is variable from 40Hz to 250Hz
  - In HIGH the FREQUENCY is variable from 250Hz to 4KHz
- FILTER:
  - LOW: Selects built in LOW PASS filter
  - FLAT: Bypasses all crossovers for full frequency range operation
  - HIGH: Selects built in HIGH PASS filter
- Input LEVEL sensitivities are variable from 0.2volts to 6volts
- Capable of 4ohms or 2ohms operation per channel, or 4ohms mono



### Full Range Stereo

This is the most basic application for the Nautic Series 2 channel amplifiers.

#### 1. Interconnect cable checklist:

Connect the LINE INPUTS to the Radio/CD with good quality RCA cables.

#### 2. FILTER Switch:

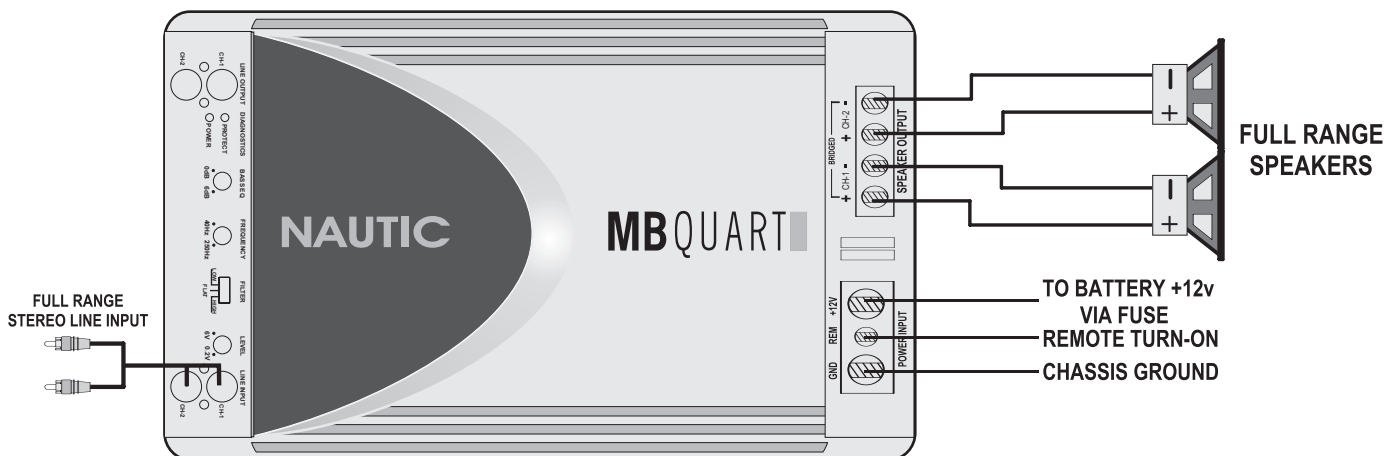
The FILTER switch must be in the FLAT position.

#### 3. Crossover frequency control checklist:

N/A for full range operation.

#### 4. Line Level:

Refer to the section "Setting up systems after installation for best performance."



### Mono / Bridged

This application illustrates the basic mono bridging method for all Nautic amplifiers.

#### 1. Interconnect cable checklist:

Connect mono line input via Y-adapter from mono source or single Left or Right RCA from stereo source.

**IMPORTANT:** Do not connect the Left and Right stereo signals together to achieve a mono signal as this will damage the output stage of the source and possibly the input stage of the amplifier.

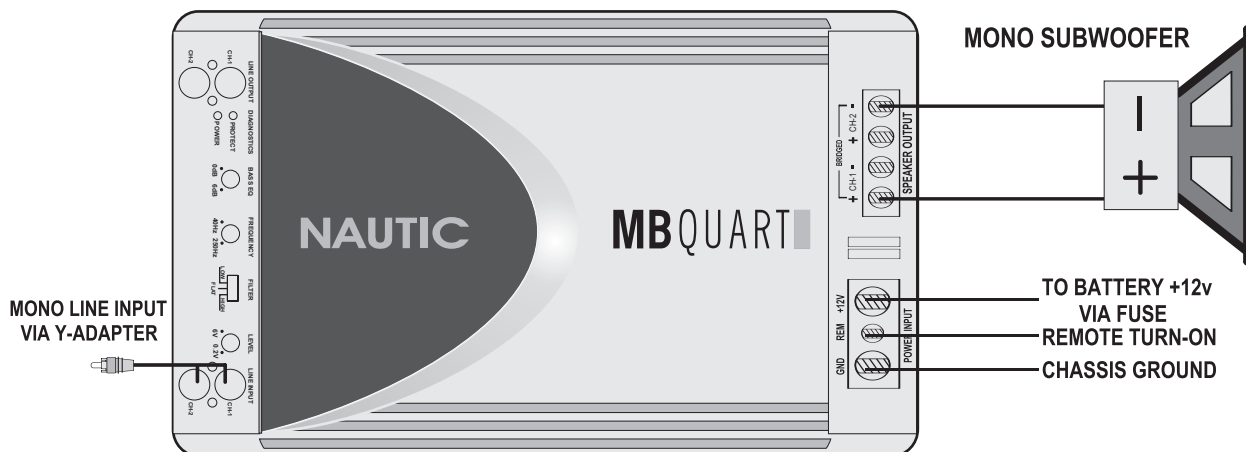
#### 2. FILTER Switch:

The FILTER switch must be in the LOW position.

#### 3. Line Level and Bass EQ:

Refer to the section "Setting up systems after installation for best performance."

**IMPORTANT:** Minimum final loudspeaker impedance presented to the amplifier is 4ohms in mono operation.

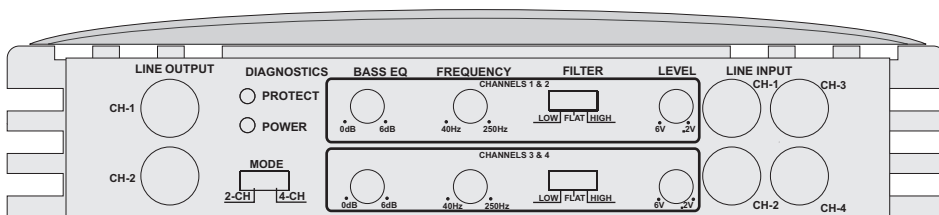


## 4-Channel Amplifier

### NAU460

#### Features:

- PROTECTION and POWER LED indicators
- BASS EQ: 45Hz bass boost from 0dB to 6dB
- FREQUENCY: Variable based on FILTER selection
  - In LOW the FREQUENCY is variable from 40Hz to 250Hz
  - In HIGH the FREQUENCY is variable from 250Hz to 4KHz
- FILTER:
  - LOW: Selects built in LOW PASS filter
  - FLAT: Bypasses all crossovers for full frequency range operation
  - HIGH: Selects built in HIGH PASS filter
- Input LEVEL sensitivities are variable from 0.2volts to 6volts
- Capable of 4ohms or 2ohms operation per channel, or 4ohms mono



### 4 Channel Full Range Stereo

#### 1. Interconnect cable checklist:

Connect the 4 inputs of the amplifier to a Radio/CD with quality RCA cables.

#### 2. FILTER Switch:

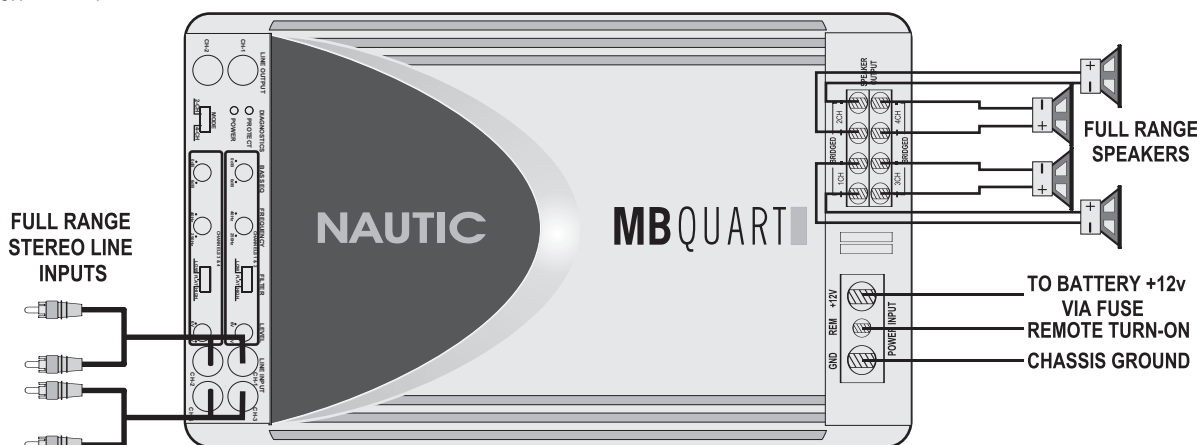
- 1/2CH FILTER : FLAT
- 3/4CH FILTER : FLAT

#### 3. Crossover frequency control checklist:

N/A for full range operation.

#### 4. Line Level:

Refer to the section "Setting up systems after installation for best performance."



### 3 Channel Operation

This illustration shows how to use your 4 channel amplifier as a 3 channel unit by taking advantage of the mono bridging capability on all Nautic amplifiers.

#### 1. Interconnect cable checklist:

- 1/2CH: Connect the inputs of channel pair 1/2 to a suitable stereo source with quality RCA cables.
- 3/4CH: Connect mono line input via Y-adapter from mono source or single Left or Right RCA from stereo source.

**IMPORTANT:** Do not connect the Left and Right stereo signals together to achieve a mono signal as this will damage the output stage of the source and possibly the input stage of the amplifier.

#### 2. FILTER Switch:

- 1/2CH FILTER : FLAT
- 3/4CH FILTER : LOW

#### 3. Mode:

4CH

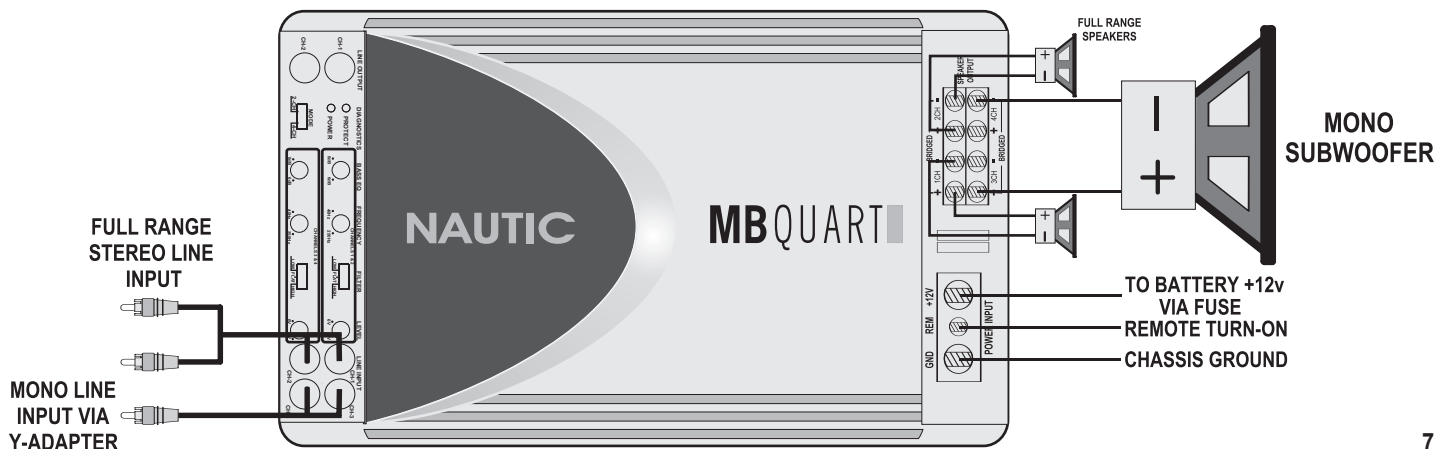
#### 4. Line Level, Bass EQ, FILTER & FREQUENCY:

Refer to the section "Setting up systems after installation for best performance."

#### 5. Speaker Connections:

Connect the subwoofer - to CH4- and subwoofer + to CH3+ terminal. Connect the remaining speakers in standard stereo wiring to CH1 and CH2.

**IMPORTANT:** Minimum final loudspeaker impedance presented to the amplifier is 4ohms in mono operation and 2ohms in stereo operation.

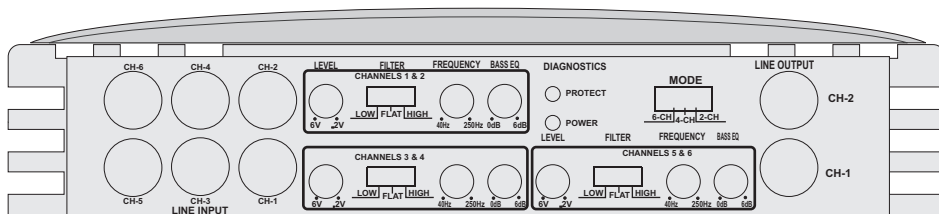


## 6-Channel Amplifier

### NAU660

#### Features:

- PROTECTION and POWER LED indicators
- BASS EQ: 45Hz bass boost from 0dB to 6dB
- FREQUENCY: Variable based on FILTER selection
  - In LOW the FREQUENCY is variable from 40Hz to 250Hz
  - In HIGH the FREQUENCY is variable from 250Hz to 4KHz
- FILTER:
  - LOW: Selects built in LOW PASS filter
  - FLAT: Bypasses all crossovers for full frequency range operation
  - HIGH: Selects built in HIGH PASS filter
- Input LEVEL sensitivities are variable from 0.2volts to 6volts
- Capable of 4ohms or 2ohms operation per channel, or 4ohms mono



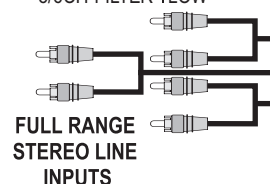
### 6 Channel Full Range Stereo

#### 1. Interconnect cable checklist:

Connect the 6 inputs of the amplifier to a Radio/CD with quality RCA cables.

#### 2. FILTER Switch:

- 1/2CH FILTER : FLAT
- 3/4CH FILTER : FLAT
- 5/6CH FILTER : LOW

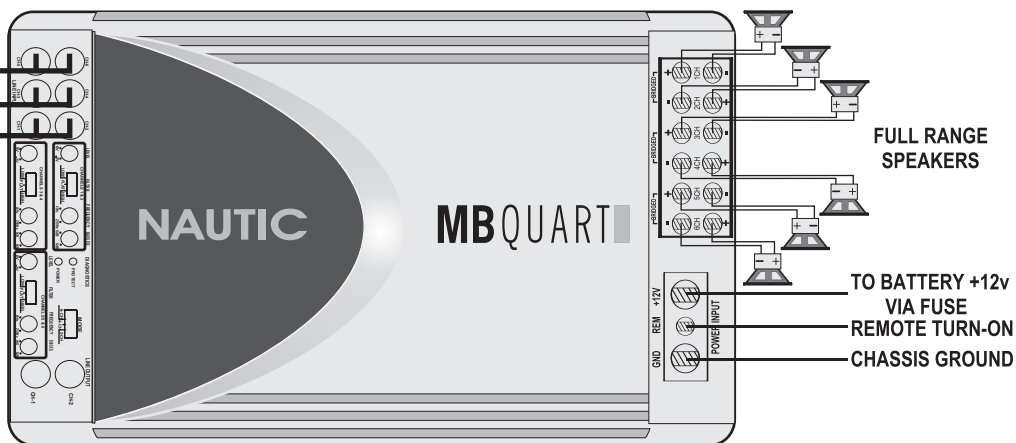


#### 3. Crossover frequency control checklist:

N/A for full range operation.

#### 4. Line Level:

Refer to the section "Setting up systems after installation for best performance."



### 5 Channel Operation

This illustration shows how to use your 6 channel amplifier as a 5 channel unit by taking advantage of the mono bridging capability on all Nautic amplifiers.

#### 1. Interconnect cable checklist:

- 1/2CH & 3/4CH: Connect the inputs of channel pair 1/2 to a suitable stereo source with quality RCA cables. Repeat these steps for 3/4CH
- 5/6CH: Connect mono line input via Y-adapter from mono source or single Left or Right RCA from stereo source.

**IMPORTANT:** Do not connect the Left and Right stereo signals together to achieve a mono signal as this will damage the output stage of the source and possibly the input stage of the amplifier.

#### 2. FILTER Switch:

- 1/2CH FILTER : FLAT
- 3/4CH FILTER : FLAT
- 5/6CH FILTER : LOW

#### 3. Crossover frequency control checklist:

N/A for full range operation. 5/6CH set to 80Hz.

#### 4. Line Level:

Refer to the section "Setting up systems after installation for best performance."

#### 5. Speaker Connections:

Connect the subwoofer - to CH6- and subwoofer + to CH5+ terminal. Connect the remaining speakers in standard stereo wiring to CH1/2 & CH3/4.

**IMPORTANT:** Minimum final loudspeaker impedance presented to the amplifier is 4ohms in mono operation and 2ohms in stereo operation.





FEATURES	2-CHANNEL	4-CHANNEL	6-CHANNEL
	NAU260	NAU460	NAU660
Output Power Rating			
4-Ohms Stereo	60 x 2	60 x 4	60 x 6
2-Ohms Stereo	90 x 2	90 x 4	90 x 6
Mono Bridge at 4-Ohms	180 x 1	180 x 2	180 x 3
Power Supply	PWM	PWM	PWM
Output Power Circuit Configuration	Mosfet	Mosfet	Mosfet
<b>Miscellaneous Spec</b>			
Soft Start Sound	Yes	Yes	Yes
Frequency Response-3dB	10Hz - 4KHz	10Hz - 4KHz	10Hz - 4KHz
Damping Factor	>180	>180	>180
S/N Ratio(A-Weight)	>93dB	>93dB	>93dB
THD & N	0.05%	0.05%	0.05%
Channel Separation	>80dB	>80dB	>80dB
Variable Input Level Control	0.2V-6.0V	0.2V-6.0V	0.2V-6.0V
Input Impedance	47kΩ	47kΩ	47kΩ
Diagnostic Indicator(power: green / protect: red)	Power/Protect	Power/Protect	Power/Protect
Protection(DC, Short, Thermal, Overload)	Yes	Yes	Yes
<b>Crossover Operation</b>			
<i>Filter for CH1&amp;CH2</i>	LOW/FLAT/HIGH	LOW/FLAT/HIGH	LOW/FLAT/HIGH
Variable Hi-Pass	250Hz - 4KHz	250Hz - 4KHz	250Hz - 4KHz
Variable Low-Pass	40Hz - 250Hz	40Hz - 250Hz	40Hz - 250Hz
Bass EQ at 45Hz	0 ~ 6dB	0 ~ 6dB	0 ~ 6dB
<i>Filter for CH3&amp;CH4</i>	LOW/FLAT/HIGH	LOW/FLAT/HIGH	LOW/FLAT/HIGH
Variable Hi-Pass	250Hz - 4KHz	250Hz - 4KHz	250Hz - 4KHz
Variable Low-Pass	40Hz - 250Hz	40Hz - 250Hz	40Hz - 250Hz
Bass Boost at 45Hz	0 ~ 6dB	0 ~ 6dB	0 ~ 6dB
<i>Filter for CH5&amp;CH6</i>	LOW/FLAT/HIGH	LOW/FLAT/HIGH	LOW/FLAT/HIGH
Variable Hi-Pass	250Hz - 4KHz	250Hz - 4KHz	250Hz - 4KHz
Variable Low-Pass	40Hz - 250Hz	40Hz - 250Hz	40Hz - 250Hz
Bass Boost at 45Hz	0 ~ 6dB	0 ~ 6dB	0 ~ 6dB
<i>Line Output</i>	Full Range	Full Range	Full Range
Others			
Power Terminal	8-GA	4-GA	4-GA
Speaker Terminal	12-GA	12-GA	10-GA
Fuse Size	15 Amp x 2	25 Amp x 2	70 Amp External
Dimensions Length x Width x Height (inches)	7.87 x 9.45 x 2.05	12.6 x 9.45 x 2.05	17.01 x 9.45 x 2.05
<b>Note: Features subject to change with out notice</b>			

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## NAUTIC NAU260 / NAU460 / NAU660

### WARRANTY

As the manufacturer of MB QUART marine products, Maxxsonics USA Inc. warrants to the original consumer purchaser of the product to be free from defects in material and workmanship for one(1) year from the date of purchase.

This product meets the current EU minimum warranty requirements, if purchased in countries of the EU.

To ensure your warranty policy, keep your original receipt proving date of purchase.

All other parts and accessories sold with this product are warranted to be free from defects in materials and workmanship for one(1) year from the date of purchase. Maxxsonics will repair or replace at it's option and free of charge during the warranty period, any system component that proves defective in materials and workmanship under normal installation, use and service provided that the product is returned to the authorized MB QUART dealer from where it was purchased.

A photo copy of the original receipt must accompany the product being returned. In the absence of the above, the warranty is one(1) year from the date of manufacture.

#### **There is no warranty for Unauthorized Internet Sales.**

Any damage to the product as a result of misuse, abuse, accident, incorrect wiring, improper installation, alteration of the date code or bar code labels, revolution, natural disaster, or any sneaky stuff because someone messed up, repair or alteration outside of our factory or Authorized Service Centers and anything else you have done that you should not have done is NOT covered.

This warranty is limited to defective parts and specifically excludes any incidental damages connected therewith. This warranty is not construed as an insurance policy.

Warranty on installation labor, removal, re-installation and freight charges are not the responsibility of Maxxsonics USA Inc.



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**MBQUART®** **AUTOTEK®**  
**HIFONICS®** **CRUNCH®**